

## REMARKS

### *General:*

Claims 1-26 are pending in the application. Claims 1-26 stand rejected.

### *35 U.S.C. § 102 rejections:*

Claims 1-2, 7-15, and 19-26 are rejected as anticipated by U.S. Patent No. 5,547,546 (Prough et al.) Prough shows a chip bin 10 in which chips are added through an air lock 10 at the top and removed through a chip meter 12 at the bottom. The chip bin 10 is filled with "a column of comminuted cellulose material," col. 3, lines 31-32, to a certain level. The level is not explicitly shown in Fig. 1, but must be within the height range covered by the level detector 26, see for example col. 5, lines 31-35 and col. 6, lines 61-65. The level must also be at least 5 feet above the bottom of the temperature sensor 41, see col. 6, lines 54-57. The chip bin 10 is provided with "a conventional header" 22 for steam generated from black liquor in flash tank 16. The steam flow rate is regulated so that the steam condenses about 5 feet below the surface of the column of chips, see col. 6, lines 53-54. "Steam is also added through the conventional supporting arms and vibrating cones via conduit 28" at the bottom of the chip bin. Col. 5, lines 5-6.

The present invention, as claimed in claims 1 and 14, in contrast, provides a chip bin with steam orifices arranged to strike chips falling through the upper part of the chip bin, that is to say, above the top of the column of residing chips, with steam. There is no disclosure or suggestion in Prough of a chip bin with steam orifices in the upper part of the chip bin, and it is believed that the present invention, as claimed in claims 1 and 14, is both new and non-obvious over Prough. The difference is significant, because one aspect of the present invention is to separate the mass of chips into individual chips, and surround each chip with steam, in order to achieve high rates of heat transfer and rapid heating of the chips. Prough, in contrast, deliberately regulates his system to keep the steam at least five feet *below* the surface of the column of chips.

The present invention, as claimed in claims 9 and 22, provides a chip bin with steam orifices to supply steam to the upper part of the chip bin, and a temperature sensor in the lower part of the chip bin. This is wholly contrary to the teaching of Prough, in which the temperature sensor is above the steam inlets, in order to locate the level at which rising

steam condenses, see col. 5, lines 23-28 and 43-60. It is therefore believed that the present invention, as claimed in claims 9 and 22, is both new and non-obvious over Prough.

The present invention, as claimed in claims 10 and 23, provides a chip bin with steam orifices positioned to direct steam downward along the surface of the tapered lower part of the bin. The examiner alleges that the conventional header 22 in Prough is a "downwardly angled pipe." Since Fig. 1 of Prough is "schematic," see col. 4, line 37, it is debatable how much reliance should be placed on its depiction of structural details. However, if Fig. 1 of Prough is sufficiently accurate to show that the header 22 is angled downwards, it is also sufficiently accurate to show that the header 22 is too high up the chip bin to direct steam "along the surface of" the tapered lower part of the bin. There is no suggestion in Prough of this feature of claims 10 and 23, and it is believed that the present invention, as claimed in claims 10 and 23, is both new and non-obvious over Prough.

The present invention, as claimed in claims 13 and 26, provides a chip bin with a source to supply cooking liquor into the lower part of the chip bin. The examiner cites col. 5, lines 1-9 of Prough. However, this describes only supplying steam generated from black liquor, and not the actual liquor. It is therefore believed that the present invention, as claimed in claims 13 and 26, is both new and non-obvious over Prough. The difference is significant because one aspect of the present invention is to supply large quantities of cooking liquor into the lower part of the chip bin. This makes it possible to form a slurry of chips in liquor that flows out of the chip bin much more easily, making it possible to dispense with the Vibra-Bin® and other anti-bridging devices used by Prough and Johanson, especially when combined with the steam propulsion discussed above with reference to claims 10 and 23. Especially when combined with the early steam-heating discussed above with reference to claims 1 and 14, and consequent degasification of the chips, liquor treatment in the chip bin can make it possible to dispense with the chip chute, and discharge from the chip bin directly into the digester.

Claims 2, 7-8, 11-12, 15, 19-21, and 24-25 are dependent from various of the claims discussed above and, without prejudice to their individual merits, are believed to be allowable over Prough for the same reasons as their respective base claims.

However, claims 2 and 15 recite upwardly-angled steam orifices arranged "to delay the falling of the chips." These are steam orifices in the upper part of the chip bin, which is where chips are falling. The only upwardly angled steam pipe identified by the examiner is pipe 28, which is at the bottom of the bin, where it would be incapable of carrying out that function. In any case, pipe 28 is not an orifice. It is a conduit supplying "conventional supporting arms and vibrating cones," col. 5, line 6. There is no teaching in Prough that the steam from conduit 28 enters the chip bin at any particular angle.

Claims 11 and 24 recite increasing the steam flow downward along the tapered bottom part of the bin in response to a "lack of normal flow" of the chips. The examiner points out that in Prough the steam flow will at least sometimes increase if the level of the column of chips rises. However, as explained above with reference to claims 10 and 23, the steam flow in Prough is not steam flow along the tapered bottom surface. Further, because Prough's level sensor controls the flow of chips through the air lock 11 as well as the steam flow, and because the steam flow is controlled by the temperature as well as the level, it is far from clear that a slowing of chip flow would reliably cause an increase in steam flow.

With reference to claims 12 and 25, there is no suggestion in Prough of additional nozzles that are used only in response to a lack of normal flow of chips.

Claim 19 recites at least two treatment zones through which chips fall with steam orifices directing steam onto them. As explained above with respect to claims 1 and 14, these treatment zones are in the upper part of the chip bin. Prough describes steam orifices only in the lower part of the chip bin, below the level of the piled up chips. The above discussion of claims 1 and 14 also applies to claim 19.

The above discussion of claims 9 and 22 also applies to claims 7 and 20.

The above discussion of claims 13 and 26 also applies to claims 8 and 21.

For these reasons also, claims 2, 7-8, 11-12, 15, 19-21, and 24-25 are believed to be novel and non-obvious over Prough.

Claims 1, 4, and 6 were rejected as anticipated by U.S. Patent No. 5,454,490 (Johanson). Johanson shows a chip bin filled with a column of chips to a level 21 with

several frusto-conical baffles to reduce the pressure of the column of chips causing bridging and plugging at the outlet. Steam may be added below each of the cone frustums.

The present invention, as claimed in claim 1, in contrast, provides a chip bin with steam orifices arranged to strike chips falling through the upper part of the chip bin, that is to say, above the top of the column of residing chips, with steam. There is no disclosure or suggestion in Johanson of a chip bin with steam orifices in the upper part of the chip bin, and it is believed that the present invention, as claimed in claim 1, is both new and non-obvious over Johanson. The difference is significant, because one aspect of the present invention is to separate the mass of chips into individual chips, and surround each chip with steam, in order to achieve high rates of heat transfer and rapid heating of the chips.

Claims 4 and 6 are dependent from claim 1 and, without prejudice to their individual merits, are believed to be allowable over Johanson for the same reasons as claim 1. However, it is respectfully pointed out that claims 4 and 6 recite baffles to guide *falling* chips and steam treatment of *falling* chips. Johanson teaches baffles and steam inlets only below the level of the accumulated chips, where the chips form essentially a continuous mass and are not treated as individual chips. Since the purpose of the baffles in Johanson is to support the weight of the mass of chips, and thereby to reduce the pressure that causes bridging and plugging, it would not have been obvious to extend the baffles of Johanson above the level 21 of the column of chips. For these reasons also, it is believed that the present invention, as claimed in claims 4 and 6, is both novel and non-obvious over Johanson.

**35 U.S.C. § 103:**

Claims 4, 5, and 17-19 were rejected as obvious over Prough in view of Johanson. Without prejudice to their individual merits, these claims are believed to be allowable over the combination of Prough and Johanson for the same reasons as their respective base claims are believed to be allowable over Prough and/or Johanson.

In respect of claims 4 and 17, Johanson is cited only as showing the baffles which are the additional feature recited in claims 4 and 17. Those claims are therefore believed to

be allowable over the combination of Prough and Johanson for the same reasons as their respective base claims are believed to be allowable over Prough alone, and additionally for the same reasons as each of claims 1 and 4 is believed to be allowable over Johanson alone.

Claims 5 and 18 recite an exhaust pipe to extract gases from the space under the baffle. This feature is not disclosed or suggested by Prough, which shows only a conventional exhaust pipe at the top of the chip bin, nor by Johanson, which does not discuss exhausting gas from the chip bin at all.

As regards claim 19, both Prough and Johanson disclose steam treatment only in the lower part of the chip bin, where the chips form a continuous mass, and not in the upper part, where the falling chips can be separated by the steam and heated directly.

For these reasons also, it is believed that claims 4, 5, and 17-19 are novel and non-obvious over the combination of Prough and Johanson.

Claims 3 and 16 were rejected as obvious over Prough in view of U.S. Patent No. 3,661,328 (Leask). Leask is cited only as showing the additional feature of claims 3 and 16 and, without prejudice to their individual merits, these claims are believed to be allowable over the combination of Prough and Leask for the same reasons as their respective base claims are believed to be allowable over Prough alone.

In addition, Leask is cited as showing a "chip bin 10 into which steam is introduced tangentially from cyclone separator 44." This is not correct. A mixture of steam and fibers is carried by the exhaust conduit 43 to the cyclone separator, where it is separated. Any steam is discharged through the overflow pipe 45. See col. 3, lines 49-50. Only the fibers are returned to the chip bin 10 and the fibers are returned from the apex of the separator 44 which appears, see Fig. 1, to enter through the middle of the lid of the bin 10. There is no suggestion in Leask of introducing anything tangentially into the chip bin 10. There is no suggestion in either Prough or Leask that introducing steam tangentially "would improve the distribution of wood chips in the bin." On the contrary, there is no suggestion in Leask of using tangential motion for any purpose except to *separate* wood fibers from gas or steam.

Furthermore, it is respectfully pointed out that the structure 10 of Prough and the structure 10 of Leask, although each is called a "chip bin," appear to be essentially different objects. Prough's chip bin is a cylindrical vertical reactor in which chips are steam-treated as a preliminary to digesting in a digester. (See the caption "to digester" at the outlet of the horizontal steaming vessel 14.) Leask's chip bin appears to be simply a bin for chips that are to be comminuted by double disk refiners 25 and 39. It is therefore respectfully submitted that it would not have been obvious to look to Leask's chip bin for improvements to the steam-treatment of chips in Prough's chip bin.

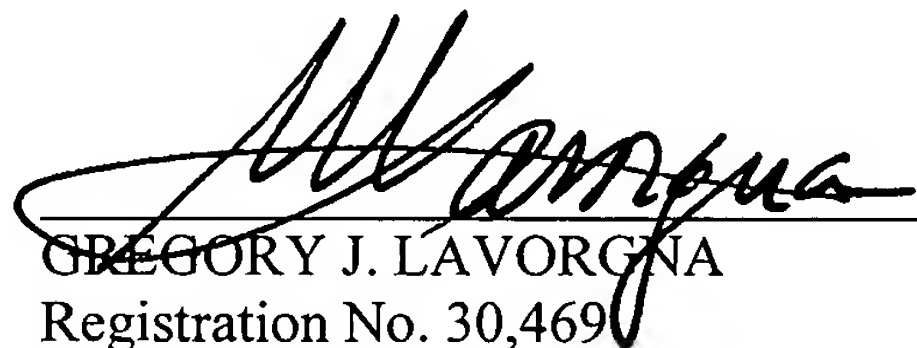
***Conclusion:***

In view of the foregoing, reconsideration of the examiner's rejections and allowance of all of claims 1-26 are earnestly solicited.

Respectfully submitted

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